

Impact of Supply Chain Integration for Operational performance, The Case of Amhara Regional State Owned Enterprises

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Abstract

The main goal of Supply Chain Integration is to achieve effective and efficient flows of products and services, information, money and decisions, to provide maximum value to the end customer. The aim of this study was to examine the effect of supply chain integration on operational performance in Amhara regional state owned Enterprises. Quantitative data which is numerical in nature were collected from primary data sources by using structured survey questionnaire. Inferential statistics were used to analyze the data. 62 both managerial and non-managerial workers who are from supply chain related functional areas were taken as a sample size of the study. Less emphasis is given for integrating the supply chain. The supplier integration, customer integration and internal integration accounts higher portion of the variance in the operational performance of firms.

Keywords: Supplier Integration, Customer Integration, Internal Integration, Operational Performance

Introduction

The term “supply chain management (SCM)” arose in the late 1980s and came into widespread use in the 1990s. Prior to that time, businesses used terms such as “logistics” and “operations management” instead. It is obviously known that there is no one single and comprehensive definition of supply chain management, therefore we can have some among many definitions of SCM. Supply Chain Management is the integration of key businesses processes from end user through original suppliers that provides products, services and information that add value for customers and other stakeholders (Lambert, 2000). Supply chain management (SCM) is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996). The original view of the supply chain has an intra-organizational focus and concentrated primarily on the integration of internal functions of the firm (Harland, 1996, Flynn et al., 2010). Hence, I am interested to

focus more on supply chain integration (SCI) which is one of the different concepts of supply chain; more detail will be given to it with in this paper.

According to (Flynn, 2010) defined supply chain integration as “the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes

Integration is the quality of collaboration that exists among clusters to achieve an effective, efficient and united system. SCI is define as the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manage intra- and inter-organization processes (Flynn, 2010).

The phrase ‘internal supply chain’ has appeared in the literature (Huin, 2002) to describe work aimed at breaking down the barriers between functions within organizations. To establish a framework for describing the key functions of a typical internal supply chain, (New, 1997) that SCM “revolves around the buying, making, moving and selling of ‘stuff’ ” is quite instructive.

The traditional approach of Measuring and managing, a function in isolation is analogous to a relay race with responsibility being passed from one function to another. SCM means thinking beyond the established boundaries, strengthening the linkages between the functions, and finding ways for them to pull together. A recognition that the ‘whole is greater than the sum of the parts’ calls for more effective integration between purchasing and procurement (buy), production planning and control (make), warehouse management (store), transport management (move) and customer relationship management(sell) (Storey, 2006).

Product or service of organizations finally delivered to the consumer through a series of often complex movements between companies which comprise the complete chain. Inefficiency anywhere in the chain will result in the chain as a whole failing to achieve its true competitive potential. The phrase ‘supply chain’ is used to indicate that the chain is only as strong as its weakest link. (Lambert, 1998) suggested that “much friction, and thus waste of valuable resources results when supply chains are not integrated, appropriately streamlined and managed”. This concept of inter-company ‘friction’ is useful in conceptualizing the need to replace fragmentation with integration.

Supply chain partners join hands together in long-term objectives and combine resources (assets, knowledge and capabilities) to deliver competitive advantage and superior performance (Chan .H, 2012). Stevens (1989) classifies supply chain integration into three levels, from functional integration to internal integration and to external integration. However, this study focuses only on internal and external integration.

The objective of the paper is to examine the effect of supply chain integration on operational performance. The motivation I have for conducting this paper initiated from assessing Supply Chain Integration practice for organizational success.

Specific Objectives of the Study

From the main objective of the study which is examining the effect of supply chain integration on operational performance the researcher tries to address the following specific objective.

- To determine the effect of supplier integration on operational performance.
- To examine whether customer integration affects operational performance.
- To check whether internal integration affects operational performance.

Theoretical Perspectives of Supply Chain Integration

Integration on Vertical (Supplier & Customer) and Functional (Internal) Perspective

Supply chain integration is a performance-improving approach that develops seamless linkages between the actors, levels, and functions within a supply chain to optimize customer service. The objectives of supply chain integration are to improve efficiency and reduce redundancy while also enhancing product availability. Supply chain integration strives to better connect demand with supply, which can both enhance customer service and lower costs.

Supply chain integration is defined as “the extent to which all activities within an organization, and the activities of its suppliers, customers, and other supply chain members, are integrated together” (Narasimhan, 1998). SCM has three independent variables in its original scale they are: internal, suppliers and customer integrations. The dominant belief is that supply chain integration (SCI) is a useful approach to improve various measures of firm performance (Van der Vaart and Van Donk, 2008). The basis of integration can therefore be characterized by cooperation, collaboration, information sharing, trust, partnerships, shared technology, and a fundamental shift away from managing individual functional processes, to managing integrated chains of processes (Pagell, 2004). In the view of Lotfi et al. (2013), measurement indicators like added values, efficiency, and customers’ satisfaction can be used to measure Supply Chain Performance.

Supplier integration refers to the degree to which a firm can partner with its key suppliers to structure their inter-organizational strategies, practices, procedures and behaviors into collaborative, synchronized and manageable processes in order to fulfil customer requirements (Yeung et al., 2009). Supplier or upstream integration increases the productivity of the Supply chain and leads to reduction of wastes.

Supply chain performance measurement and auditing are of particular relevance at a time when SC networks have become and communication technology, advances in manufacturing processes, shortened product lifecycles and discerning customers demanding high quality products at low prices (Kostina et al., 2012; Mondragon et al., 2011).

The fact that SCM is a boundary-spanning activity implies that both cross-functional and inter-organizational management efforts are important (Bowersox, Closs, and Stank 1999; Day 1994). Stevens (1989) emphasized that true supply chain integration includes both upstream and downstream players, while internal integration provides the foundation for both. Both internal and external integration can contribute to achieving reductions in costs, stock-outs, and lead-time, and can lead to competitive advantage (Gimenez and Ventura 2003). Therefore, a firm is likely to obtain superior performance when achieving high levels of integration both internally and externally.

Internal Integration: Internal integration involves cross functional teams that may bring together a carefully selected array of specialists who share information and make product, process, and manufacturing decisions, jointly and simultaneously (Koufteros, Vonderembse & Jayaram, 2005). Furthermore, Supply chain partners who exchange information regularly are able to work as a single entity, and can understand the needs of the end customer better and hence can respond to market change quicker (Stein, 1998). A prerequisite for successful SCM is internal integration (Lambert, Cooper & Pagh, 1998).

External Integration: Firms have turned to collaborate with their customers and suppliers to obtain information and complementary resources, which they can deploy to build competitive advantage. External supply chain integration reveals two major areas of emphasis. They are: Customer integration (CI) and Supply integration (SI). Supplier integration also called “backward” integration (Frohlich and Westbrook, 2001) refers to the process of interaction and collaboration between an organization and its suppliers to ensure an effective flow of supplies (Zhao et al, 2011). Customer integration, also called “forward” integration (Frohlich & Westbrook, 2001) refers to the process of interaction and collaboration between an organization and its” customers to ensure an effective flow of products and/or services to customers (Zhao et al. 2002). Customer integration involves sharing demand information, help the manufacturer to understanding better the customer needs and to forecast better customer demand, as well as collaborative involvement of customers with respect to product design, provision of better quality products at lower cost and more flexibility in responding to customer demand (Flynn et al. 2010).

Empirical Studies

There is positive relationship between SCI and firm performance and it encompasses information integration, operational integration (internal integration) and Relational integration (supplier and customer). Lee (2000) Supply chain integration is the secret of success in today world of intense competition (Leuschner, Rogers and Charvet 2013).

Research on finding the impact of SCM practices on firm performance and organization’s competitive advantage it was analyzed that modern SCM practices have significant positive impact on not only firm performance but also on gaining competitive advantage among the firms because competition in this era is not only among firms but among different supply chains (Li, Nathan, Nathan, & Rao, 2006).

Flynn, Huo and zhao (2010) in study on impact of SCI on performance in Chinese manufacturing sector explored the benefits derived from internal and external integration in terms of reduced inventory cost, improved lead time, accurate demand forecasting, efficient flow of material and goods among supply chain partners.

The purpose of SCI is to achieve excellence in operations and achieve economies of scale through state of art collaboration among all stakeholders. The purpose of SCI is not fulfilled just due to adoption of modern equipments and technologies but it needs to develop such organization norms that facilitate shared work and group vision (Richey, 2010). Downstream integration is a key managerial area to improve performance in supply networks. Though most studies agree that downstream integration positively influences performances, the literature also reports cases of failures in achieving significant improvements (e.g. Dabhilkar, 2011; Danese and Romano, 2012; Lintukangas et al., 2009). Supply chain integration led to better business performance (Abdullah A., 2011).

Most of SCI studies view that level of SCI has a positive influence on performance outcomes. Kim (2009) argues that there exists a significant interrelationship between SCI practice level and competition capability.

Operational Performance

With respect to Supply Chain performance, a large number of measures have been used in the literature, stressing that performance is a multi-dimensional concept itself (Van Donk & Van Der Vaart, 2005; Hartmann et al., 2012). A performance measurement program for a Supply Chain should be complete—important aspects of performance in any link are not ignored—and they must be tailored to varying needs of participants. This requires collaboration of industry consortiums, consultants, and researchers.

Internal integration can help functions to leverage each other's resources and capabilities to jointly design products, ensure product quality and reduce duplicated tasks (Schoenherr and Swink, 2012). For example, Tan (2001) found that internal integration could create a close link between manufacturing and distribution processes to deliver products and services in a timely and effective manner. Efficient external process integration allows manufacturers to speed up product delivery processes, improve production planning and reduce inventory obsolescence using accurate information about customer demands and preferences (Swink et al., 2007). Further, process integration with suppliers helps manufacturers reduce mistakes and enhance product quality through information sharing and joint planning, which are directly related to the manufacturers' operational performance (Petersen et al., 2005). Product integration with suppliers and customers can enhance manufacturers' new product development capabilities, promoting product quality, flexibility and innovation in addition to product competitive advantage (Koufteros et al., 2007).

Many studies have investigated the relationship between SCI and financial performance, and it is generally accepted that the SCI enhances the performance. For example, Frohlich and Westbrook (2001) concluded that manufacturers with the widest degrees of supplier and customer integration achieve the best performance improvements in terms of market share and profitability. Droge et al. (2004) found that both internal and external integration were related to financial performance through time-based performance. Zailani and Rajagopal (2005) noted that manufacturers with the greatest degrees of external customer and supplier integration achieved the highest overall performance improvement. The literature suggests that internal and external process and product integration can directly contribute to manufacturers' financial performance. Furthermore, it indicates that operational performance plays an important role in the relationship between SCI and financial performance. The literature also provides evidence that operational performance positively influences financial performance (Inman et al., 2011)

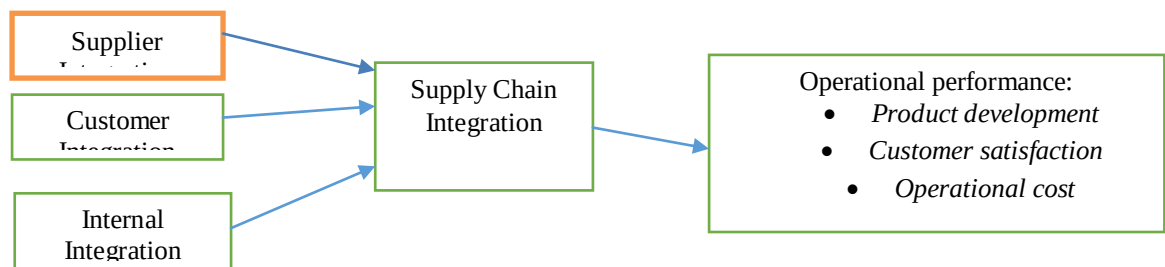


Figure -1 Theoretical Framework

Hypothesis

H1= Supplier integration has no positive impact operational performance?

H2= Customer integration has no positive impact operational performance?

H3= Internal integration has no positive impact operational performance?

Methodology

Research Design

Quantitative research approach was employed with focus of survey design which provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. From sample results, the researcher generalizes or draws inferences to the population.

In order to achieve the objectives of this study, an inferential statistics, specifically a cross-sectional survey design was used.

Data Type, Source and Collection Technique

Quantitative data which is numerical in nature were collected from primary data sources by using structured survey questionnaire. Primary data involves getting views of study participants who are the key informants to the study. The primary data for this study was gathered from participants consisting of employees from the case organizations who are in managerial and non-managerial positions. The researcher needs to choose the most effective data collection instruments if they are to collect sufficient and usable data in their respective studies. In view of the above fact, the tool designed to collect the required data for this study was questionnaire. The question items related to main research question has a five point Likert Scale format where participants are required to put tick mark in the box that best represented their best opinions. , the quantitative data was coded, i.e., the edited raw data was converted into numbers and then tabulated to count the number of samples falling into various categories and then it was transformed into Statistical Packages for Social Sciences (SPSS), version 20.0 for analysis.

Sampling

The managers and workers who performed the supply chain management function within the organizations are the target population of the study. Four state owned enterprises in Amhara Regional State were selected randomly as sample firms of which 62 both managerial and non-managerial position workers who are from supply chain related functional areas were taken as a sample size of the study.

Data Analysis

In analyzing the quantitative data inferential statistics were used to examine the effect of supply chain integration on operational performance. An ordinal measurement scale, which is a ranking of rating data that normally use integers in ascending order, was used in this study. The numbers assigned to the agreement scale (5, 4, 3, 2, 1) do not indicate that the intervals between the scales are equal, nor do they indicate absolute quantities (Naoum, 1998).

Operational performance = β supplier integration + β customer integration + β internal integration

Analysis and Findings

Bivariate Pearson's Correlation

Inspection of the numerical value of a correlation coefficient will yield clear indication of the strength of the relationship between the variables in question. Low or near zero values indicate weak relationships, while those nearer to +1 or -1 suggest stronger relationships (Louis Cohen, 2007). The magnitude of the correlation coefficient determines the strength of the correlation. (Louis Cohen, 2007) Although there are no hard and fast rules for describing correlational strength,

$0 < |r| < .3$ weak correlation

$.3 < |r| < .7$ moderate correlation

$|r| > 0.7$ strong correlation

Table -1 Correlations

		SuI	CuI	InI	OpP
SuI	Pearson Correlation	1	.673**	.573**	.655**
	Sig. (2-tailed)		.000	.000	.000
	N	62	62	62	62
CuI	Pearson Correlation	.673**	1	.683**	.754**
	Sig. (2-tailed)	.000		.000	.000
	N	62	62	62	62
InI	Pearson Correlation	.573**	.683**	1	.833**
	Sig. (2-tailed)	.000	.000		.000
	N	62	62	62	62
OpP	Pearson Correlation	.655**	.754**	.833**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	62	62	62	62

**. Correlation is significant at the 0.01 level (2-tailed).

As can be seen clearly from table-1 there is moderate level positive relationship between supplier integration and operational performance with correlation of 0.655 and Both customer integration and internal integration have strong positive relationship with operational performance with correlation of 0.754 and 0.833 respectively.

Model Testing

Where a correlation coefficient has been derived from a sample and one wish to use it as a basis for inference about the parent population, the statistical significance of the obtained correlation must be considered. Statistical significance, when applied to a correlation coefficient, indicates whether or not the correlation is different from zero at a given level of confidence. The square of the coefficient of correlation, r^2 shows the proportion of variance in one variable that can be attributed to its linear relationship with the second variable (Louis Cohen, et al, 2007).

The R square tells us how much variance in the dependent variable is explained by the independent variable in the calculation. The adjusted R square is more accurate, and I advocate its use, as it automatically takes in to account of the number of independent variables.

(Muijs 2004) suggests that, for a goodness of fit with an adjusted R square:

<0.1: poor fit

0.11–0.3: modest fit

0.31–0.5: moderate fit

Table -2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.878 ^a	.771	.759	.34069	.771	65.006	3	58	.000

>0.5: strong fit

a. Predictors: (Constant), InI, SuI, CuI

As shown in table-2 the adjusted R square is 0.759, and this indicates that, in the regression model, the independent variable (customer integration, supplier integration and internal integration) accounts for 75.9 percent of the variance in the dependent variable (operational performance), which indicates that our regression model is robust.

Hypothesis Testing

Table -3 correlation Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.059	.201		-.294	.769	-.463	.344
1 SuI	.152	.086	.153	1.764	.083	-.020	.324
CuI	.253	.093	.265	2.720	.009	.067	.440
InI	.555	.086	.565	6.416	.000	.382	.728

a. Dependent Variable: OpP

Having set the null hypothesis, the researcher then sets the level of significance (α) that is used to support or not to support the null hypothesis; this is the alpha (α) level. The level of alpha is determined by the researcher. Typically it is 0.05, i.e. for 95 per cent of the time the null hypothesis is not supported. In

writing this we could say 'Let $\alpha = 0.05$ '. If one wished to be more robust then one would set a higher alpha level ($\alpha = 0.01$ or $\alpha = 0.001$). This is the level of risk that one wishes to take in supporting or not supporting the null hypothesis (Louis Cohen, et al, 2007).

Supplier integration with alpha value of 0.083 ($\alpha < 0.1$) have a positive impact on operational performance at a confidence level of 90%. Customer integration have a positive effect on operational performance at 95% level of confidence with alpha value of .009. ($\alpha < 0.05$). Internal integration with alpha value of 0.000 ($\alpha < 0.001$) have a positive significant effect on operational performance at 99.9% confidence level.

All the independent variables (Supplier integration, Customer integration and Internal integration) have a positive significant impact on operational performance with a confidence level of 95% expect one that is supplier integration with alpha value of 0.083, which is significant at the confidence level of 90%. This shows that all hypotheses are supported.

Conclusion

Based on the research findings conclusions are drawn that the researcher thought to be very critical. Less emphasis is given for the supply chain integration (supplier integration, customer integration and internal integration) that leads to low level of operational performance. There is strong correlation between supplier integration, customer integration and internal integration with operational performance. Supplier integration, customer integration and internal integration accounts majority of the variance in the operational performance. Supply chain integration (Supplier integration, customer integration and internal integration) plays significant impact on organizations operational performance.

Recommendation

Firms should give due emphasis for suppliers, customers and internal integration that helps them to improve their operational performance. The firms should well control the supply chain, since it affects higher portion of operational performance of firms

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